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SCIENCE NEWS LETTER

TECHNOLOGY DEPT.

THE WEEKLY REVIEW OF CURRENT SCIENCE • AUGUST 18, 1945

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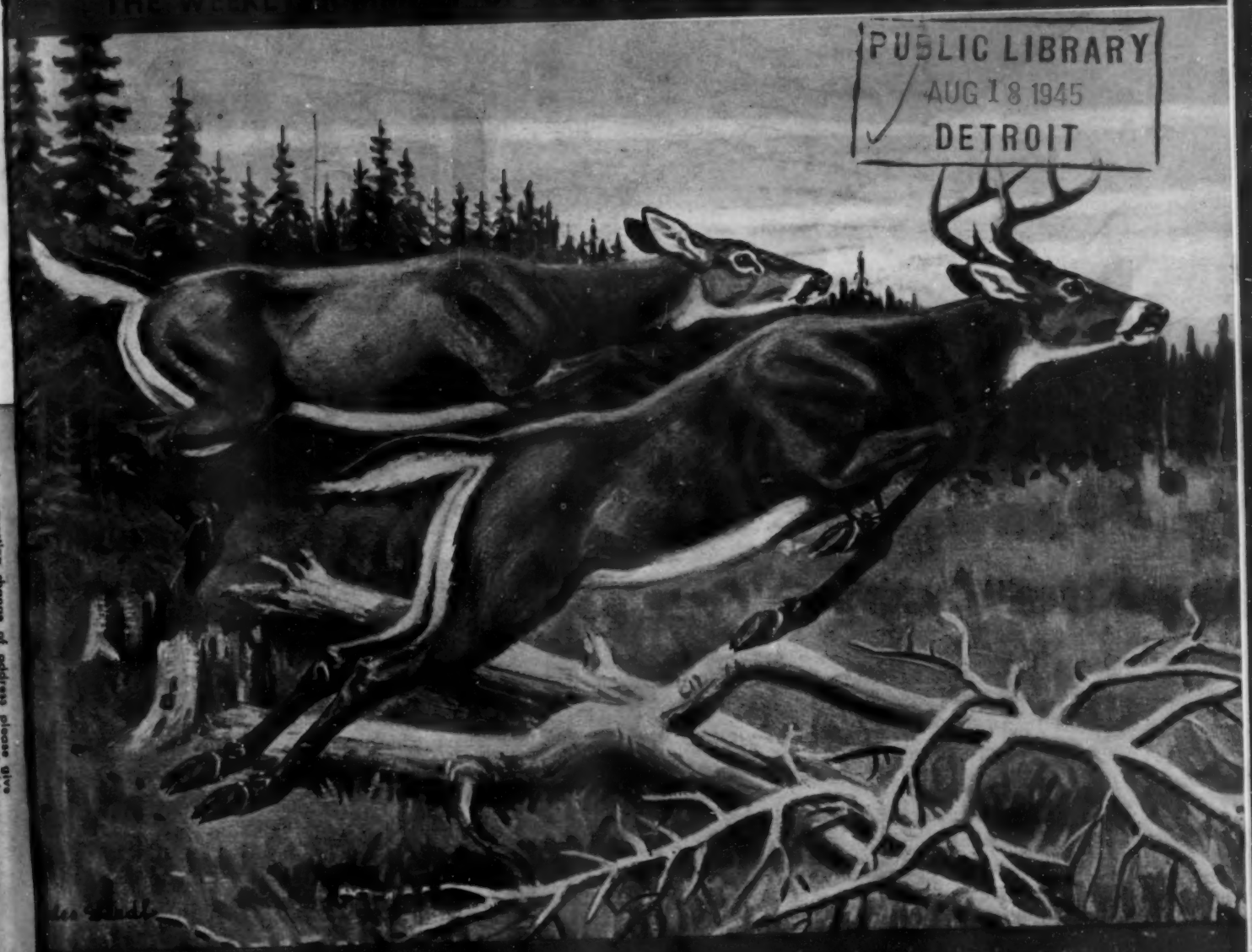

Fugitives Security

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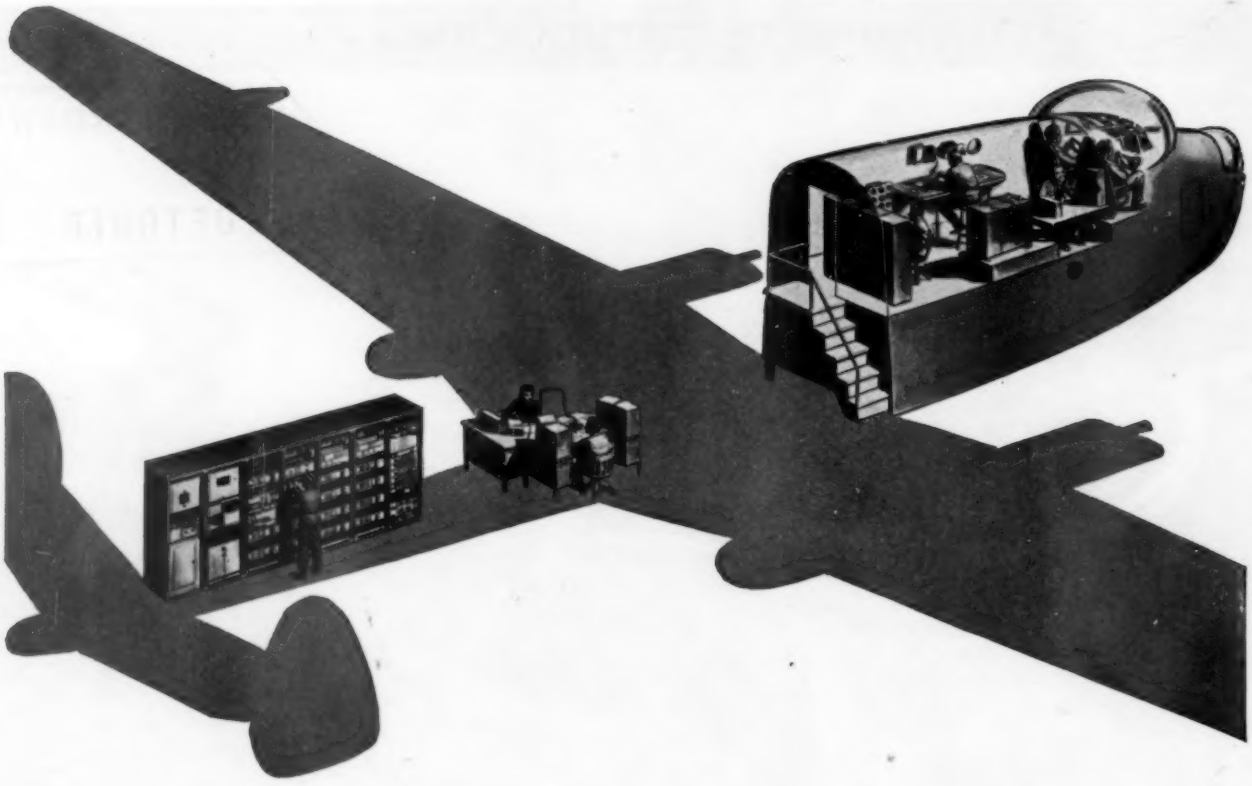
A SCIENCE SERVICE PUBLICATION

THIS SEA-GULL LIVES ON THE GROUND



This is a "flight trainer"— an electronically operated replica of the PBM-3 flying boat. It was conceived by the Bureau of Aeronautics and developed by Bell Laboratories to train Navy crews on the ground.

The new crew climb a few steps to get in and from then on it is like being in a big plane at night. Controls tug against the pilot's grasp and "engines" roar in response to the throttle. From his desk, the instructor creates every situation of real flight — even to iced-up wings, conked-out engines and sudden air-pockets. Pilot and crew get the feel of danger without the hazard.

Once the control dials are set, the various effects are automatically organized and set in motion by concealed machinery which includes 200 vacuum tubes, 60 motors, loudspeakers and hundreds of associated parts. Twenty Laboratories engineers worked more than a year developing the project. Drawings covered an area equal to 15,000 square feet.

This is only one of the 1200 projects in which our experience has been able to help the Armed Forces. What we have learned in devising electronic circuits to train flyers will help build better telephones.

BELL TELEPHONE LABORATORIES

Exploring and inventing, devising and perfecting for the Armed Forces at war and for continued economies and improvements in telephone service.

AERONAUTICS

Fastest Fighter

The jet-propelled P-80, a low-wing, all-metal, single-place craft, has a speed of over 550 miles an hour. Its service ceiling is 45,000 feet.

➤ THE NEW jet-propelled combat plane, the P-80 Shooting Star, has a speed of over 550 miles an hour and is probably the fastest fighter in existence. Performance data and other information relative to this new craft were released by Gen. H. H. Arnold, commanding general of the Army Air Forces. It has a service ceiling of more than 45,000 feet, and armament of six .50-caliber machine guns.

The P-80 is a low-wing, all-metal single-plane craft intended for interception and attack of enemy planes at high altitudes. It has an interchangeable nose constructed for photographic equipment, so can also serve for high-speed photo reconnaissance.

The plane is one of the "cleanest" aerodynamic aircraft in existence. Air scoops and the bubble-type free-flow canopy are the only protuberances on the fuselage, which actually is round in shape but appears oval when viewed head-on. The wing tapers both at leading and trailing edges. The canopy is mounted well forward of the wing to give improved visibility for the pilot. An armor-glass windshield and steel armor plate afford the pilot protection.

Each wingtip is equipped with shackles for bombs or droppable fuel tanks. The nose section, aside from armament or photographic equipment, contains compartments for oxygen and radio equipment. The mid-section houses the cockpit in the forward structure, a fuel tank compartment in the center, and the power plant at the after end. The after section supporting the tail group is joined to the mid-section with detachable fittings to facilitate power-plant removal. A complete engine change can be made in 20 minutes.

Designed and developed in cooperation with Army engineers, the new jet-fighter is produced by the Lockheed Air Corporation. Its gas turbine engine is built by General Electric and by the Allison Division of General Motors. The engine is larger and greatly improved over others previously used, but is a light, compact unit, considering its power output.

The P-80 has a wing-span of 39 feet and is only 11 feet 4 inches high from the ground to the tip of the rudder. It is 34 feet 6 inches in length; its empty weight is approximately 8,000 pounds. Carrying a maximum fuel load for long-range operation, its weight is 14,000 pounds.

Magnesium rather than aluminum is used for engine castings, saving 100 pounds of weight. The first P-80 engines were designed to operate on kerosene, but now, with modification of the fuel system, can operate on gasoline of any octane rating.

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AERONAUTICS-VOLCANOLOGY

Helicopter Performs Well Over Mexican Volcano

➤ EVEN at two miles above sea level the Army's Sikorsky helicopter, although built for lower altitude operation, will fly successfully and do jobs in war and peace that conventional airplanes cannot do.

This has been proved by two weeks of helicopter flights at the Mexican volcano, Paricutin, in an expedition of the Army's Air Technical Service Command of Wright Field, Dayton, Ohio, and the U. S.-Mexican Volcano Commission.

Several dozen flights have been made carrying scientists of Mexico and the United States aloft for leisurely views of the new volcano that after 2½ years is still in active eruption.

Igor Sikorsky, pioneer aviation engineer and designer of the helicopter used, joined the the expedition at the volcano for several days and made several hops in his helicopter as a passenger. The performance of the volcano interested him almost as much as the way the helicopter behaved. Last year he visited Paricutin and had a ground view of its splendor by night and by day. On this trip he lived at the helicopter camp near the lava-destroyed village of San Juan Parangaricutiro, and was able to take to the air when it was desired to observe the changing moods of the natural monster.

Just how the helicopter would act at the 7,200 foot altitude of the volcano's base or the 10,000 foot altitude necessary to fly above it was an unanswered question before the expedition. Now Mr. Sikorsky and the Army's helicopter experts are sure that the helicopter can perform military missions at high altitudes as it has at lower altitudes.

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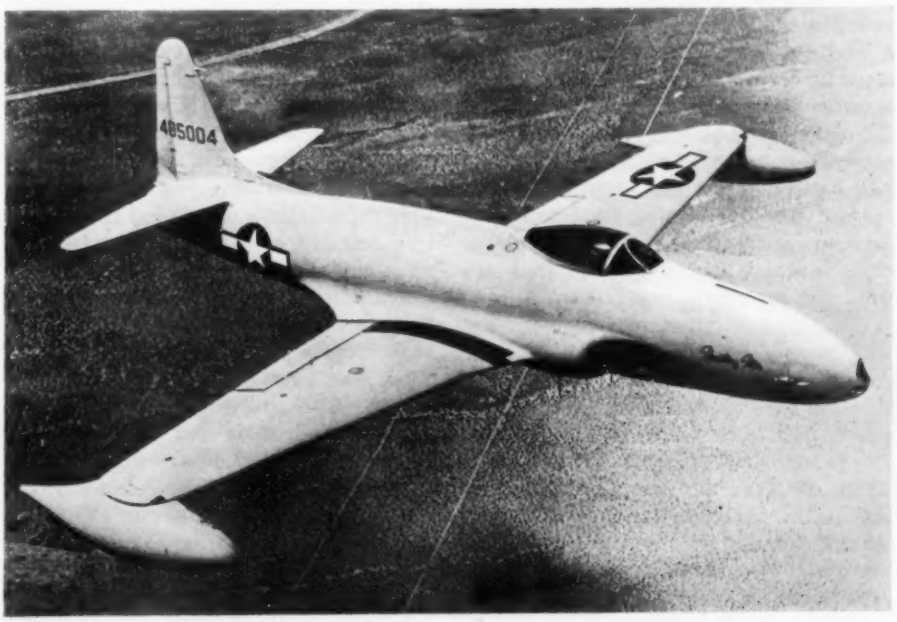

JET FIGHTER—Shown in flight is the U. S. Army Air Forces' new P-80 Shooting Star. The plane is powered by a new jet propulsion gas turbine engine and is capable of speeds in excess of 550 miles per hour. The service ceiling is above 40,000 feet.

AVIATION MEDICINE

German Research Used

Among developments surrendered by Nazis is catapult seat for bailing out of planes at high speed. Will save lives of American flyers in Pacific.

➤ RESEARCH by German scientists will soon be saving the lives of American flyers fighting in the Pacific. Col. W. Randolph Lovelace, who has recently returned from Germany where he accepted the surrender of precious results of painstaking and valuable scientific investigations, said that he expects some of the German developments to be of great value to us. Col. Lovelace is Chief of the Aero Medical Laboratory at Wright Field, Ohio.

Perhaps the most important of those that can be made public is a catapult seat for airplane pilots which will make it possible for the pilot to bale out of a plane flying at a speed of over 500 miles an hour and out of control. At the will of the pilot, this seat will automatically toss him, seat and all, 15 or 20 feet into the air above the plane and clear of it. It is the only safe way, Col. Lovelace said, to get out of a plane going at that speed, and there are circumstances in combat when it is not possible for the pilot to reduce the speed of his plane before jumping. The seat will work at an altitude of 30,000 feet, and it is good at low altitudes, too.

The Germans, Col. Lovelace found, realized fully the importance of basic research and kept it up even under great difficulties of bombing and having to move from place to place as our forces and those of our allies swept over Germany. They also kept up the training of men for scientific research; enrollments in technical schools were still high up until last summer.

Col. Lovelace found the German scientists quite willing to cooperate with their American captors. They had been ordered to burn all documents and research papers of a secret or confidential nature. But in many cases this was not done. Instead, the Germans carefully filed their documents in metal boxes which were welded shut and then buried. These were cheerfully dug up at the request of the Americans. All reports were made out in careful detail and research was of an excellent quality. It will save us years of time as well as lives. In other cases, the documents were burned as ordered, but previously were all microfilmed to preserve the scientific labor involved.

In addition to turning over reports already completed, the scientists offered to make drawings showing their developments, make parts if required, or even outline plans for future research.

Other research of importance to us was the work on optics—optical testing and experimental equipment, equipment for grinding special glasses, and telescopes, which was conducted at the Zeiss laboratories. A novel and useful instrument was one for measuring the illumination of the night sky.

They have done wind tunnel research on the ability of men to withstand a wind of as high as 530 miles per hour. We have done wind tunnel research on human subjects, but only went up as high as 180 to 200 miles per hour. The German medical scientists acted as their own subjects for this research.

In only one investigation was it found that the German flight surgeons used prisoners for their medical research. That was in a study of the effects of being in cold water or very cold environment. In six cases this research was carried up to the point of death. Death would occur, Col. Lovelace said, in water of about freezing temperature with a high wind after only about 30 minutes exposure. The prisoners used were both military and political prisoners, but did not include any Americans.

In most fields it was found that American research is better than the German research was. Outstanding of our own developments in use over Germany is the 2½ pound G-suit. This light suit helps to prevent or delay "blackout" of flyers in the fast loops and turns of combat by automatically applying support to the abdomen and legs. It had a great deal to do with the ability of American flyers to shoot down the Germans' fast ME-262 plane in combat against our P-51. The Germans were preparing to copy our suit when the war ended.

The Germans also credited our flyers who were captured by them with knowing more about the physiology of how the human body acts during flight than was known to some of the German flight surgeons. Col. Lovelace attributed this to a book which presents scientific findings about flight in an interesting and humorous way with a liberal use of cartoons, "Your Body in Flight."

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Animal hoofs and horns do not yield *glue*, but the piths of the horns are good sources of raw material for this widely used material.

Digger pine, or gray pine, found only in California, bears rich nutlike seeds, on which Indians once subsisted during a part of each year.

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ENTOMOLOGY

Mosquito Larvae Die

The wigglers get cramps and drown when their breeding pond is treated with DDT. Scientist who made this discovery was killed on Okinawa in June.

➤ WHEN mosquito breeding ponds are treated with DDT, the wigglers or larvae get cramps and, like many human swimmers similarly afflicted, drown.

The discovery of this effect of DDT on the larvae of malaria mosquitoes was made by John D. Maple, formerly of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. Mr. Maple was killed while fighting mosquitoes on Okinawa last June.

The symptoms of DDT poisoning of the wigglers of malaria mosquitoes, he reported, are "excessive swimming along the water surfaces and occasional tremors, followed by sinking."

Whether or not the wiggler gets enough DDT poison to kill it outright, it sinks and tries to struggle back to the surface for air but is not able to make it, and so drowns.

The discovery of how the wigglers die when ponds are treated with DDT explains why this potent insecticide gets quicker action against the wigglers than against adult mosquitoes.

Although the best mosquito killer ever discovered, DDT is not the fastest. In Department of Agriculture studies, microscopic crystals of DDT have been fed to individual mosquitoes. Many of the insects lived for hours, but died in a day or less. Death was sometimes slow but always sure.

From the standpoint of mosquito killing, the cause of death is immaterial; the wiggler that drowns will never be able to carry malaria germs. From the standpoint of control of malaria, yellow fever, dengue, filiarasis and some other diseases, the delay in the action of DDT may, or may not, prove of importance. DDT is still so new that scientists have not been able to make the careful studies required to enable them to say whether a poisoned adult mosquito can attack and infect a person after it has been poisoned but before the poison takes effect. Research programs are working full speed ahead to answer as many as possible of such questions both to improve the immediate protection DDT is giving to the armed forces, and to prepare the way for safe use of DDT by civilians.

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BROWN BEAR—This is one of the paintings by Charles Liedl that are on exhibition in the Education Hall of the American Museum of Natural History in New York from July 20 to August 19. The picture of the white-tailed deer on the front cover of this SCIENCE NEWS LETTER is also among those on exhibition.

ENTOMOLOGY

Cattle Ticks Controlled

DDT-rotenone spray checks the pests in the tropics. Length of effectiveness of treatment varies with the climatic conditions.

➤ SPRAYING with DDT and rotenone mixture provides a practical and economical solution of one of the major problems of cattle raisers in tropical and sub-tropical regions, control of cattle ticks, it was announced at the Third Inter-American Agricultural Conference by Dr. Earl N. Bressman, Director of the Interamerican Institute of Agricultural Sciences at Turrialba, Costa Rica. It is expected that the new method will be applicable from the northern provinces of Argentina to the southern United States.

Cattle-dipping vats, which have been widely successful in tick control in temperate regions, have had considerably less success in the tropics, for a variety of reasons. Over large areas the necessity of depending on relatively untrained personnel resulted in high mortalities because of poorly designed dipping vats, arsenic poisoning of cattle, mechanical abortion, and other injuries. Furthermore, the intense tropical heat often caused deaths from overheating, especially in the case of animals that had to be driven long distances to the vats—which often cost in the neighborhood of $4,000 each—and the cattle suffered from decreased milk production and, in the case of the ubiquitous oxen, from lack of rest following dipping.

After 110 experiments over a period of three years, Dr. Robert L. Squibb, of the Institute's Division of Animal Industry, developed a new spray solution, specific for use against the cattle tick, a mixture of DDT and rotenone. One hundred cubic centimeters of the solution is sufficient, used as a fine spray, to cover an animal, at a cost of as little as one-half cent, depending on local conditions. A wide variety of spraying equipment, ranging from a hand-operated flit gun to power equipment, secures equally effective results. A tick mortality of 95% has been recorded from animals with an infestation of as high as 40 ticks per square inch.

Length of effectiveness of the treatment varies with climatic conditions, as does cattle dipping, and the solution has continued to give protection against the ticks up to 80 days. Spraying between the animals' legs and in body crevices is not necessary since once engorged ticks have dropped off, the animal is not reinfested during the period of spray effectiveness. More than 7,000 applications have been given over a period of nine months, with no indication of a poisonous tendency.

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CHEMISTRY

Sulfuric Acid's Future

Now producing at a rate of 10,000,000 tons a year, it does not face as severe a cut-back after the war as many other industries do.

➤ THE SULFURIC acid industry of the United States, now producing at a rate of over 10,000,000 tons a year, does not face as severe a cut-back in production after the war as many other industries because much of the acid used in the production of war essentials is not consumed in the process and is recovered and remarketed, being suitable for use in other industries. In postwar days it will go directly to these present secondary users.

"Of the sulfuric acid value supplied the TNT manufacturer, approximately 95% is returned to the market as a recovered spent acid," states Alonzo White III, of the War Production Board, in *Chemical and Engineering News* (July), "and may be used to fulfill requirements in the steel, petroleum, heavy chemical, and superphosphate fertilizer industries." The publication is an official organ of the American Chemical Society.

Sulfuric acid, he points out, is not a one-purpose product. It finds applications as a dehydrating agent, catalyst, active reactant in chemical processes, solvent and absorbent. Acids produced are of different strengths and degrees of purity. Sulfuric acid is produced by several different processes. The user must select the acid with the specifications required for his particular use.

Aviation fuel production requires large quantities of sulfuric acid for its alkylation process which results in an "alkylation spent" acid. This, Mr. White says, may be hydrolyzed to remove hydrocarbons present, or processed "as is" in a sulfuric acid decomposition unit and converted to clean acid. The recovery may range as high as 90% of the acidity value supplied, depending on the equipment available and the method of handling at the refinery.

Smokeless powder production also uses large quantities of sulfuric acid in the manufacture of the nitrocellulose for the powder. Recovery of the acid from this process is not as great as in the manufacture of TNT. In making nitrocellulose for smokeless powder, there is a loss, he states, of about half a pound of the acid for each pound of the nitrocellulose produced.

"Indications are," Mr. White concludes, "that there will be a gradual conversion of some industries to peacetime activities from now until VJ Day, at which time extensive changes are anticipated. Some of the conversions will result in slight increases in sulfuric acid usage."

Steel will consume more for pickling purposes, and the superphosphate fertilizer industry is capable of consumption of considerably more acid than is now being consumed.

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ASTRONOMY

Very Red Stars Are Easily Detected

➤ VERY RED STARS whose spectra show an abundance of titanium oxide and carbon compounds show a special distribution in our part of the galaxy, report Dr. Oliver J. Lee, director, and Thomas J. Bartlett of the Dearborn Observatory of Northwestern University.

The titanium oxide stars, known to astronomers as types M5 to M8, are more easily detected and classified on plates made at the observatory than any other stars, so if others had been present in the regions studied, they undoubtedly would have been identified during the Dearborn survey of faint red stars.

The second of three parts of the survey has just been announced in the Annals of Dearborn Observatory. So far nearly one-third of the total area of the sky, or about 14,000 square degrees, has been studied.

M-type dwarf stars of absolute magnitude 9.7, which means stars only about 1/100 as bright as the sun, have been observed to a distance of about 123 light years, or 722,000,000,000,000 miles away. Ordinary giants and supergiants located hundred of times farther away were also studied. Thus these giants have been hunted far and wide, and if they are well distributed in our galaxy, considerable numbers should have been recorded on the photographic plates as faint stars.

Among the 22,680 stars which have been catalogued thus far at the observatory only 1,499 were of the advanced titanium oxide type.

Because of the foregoing considerations, and because of the relatively high concentration of carbon stars in the anticentric regions of the Milky Way, several questions which would bear further investigation have occurred to the Dearborn astronomers:

Does our branch of the Milky Way have an unusually abundant supply of carbon and its compounds? Is this true also of the titanium oxide molecule in stars of advanced M type?

If so, is this due to quite irregular distribution of those cosmic materials or does our part of galactic space have properties which tend to make them more favorable materials for building stars?

Is our branch of our galaxy a somewhat recently developed subdivision, or possibly a very old one, in which a carbon cycle and perhaps a titanium cycle have gone berserk and rule the destinies of stars for a brief period with complete abandon?

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PUBLIC HEALTH

Polio Cases Are Less Than This Time Last Year

➤ ALTHOUGH the number of infantile paralysis cases reported to the U. S. Public Health Service is still increasing, fewer cases have been reported for each of the last six weeks than for the corresponding period last year. This would seem to indicate that the number of cases throughout the country may not reach epidemic proportions.

A total of 963 more cases were reported last year than this year for the six weeks from June 16 to July 28. Up to June 7, more cases were reported for this year than last. There will probably continue to be an increase in the number of cases reported until September, but the increase is expected to be slight in comparison with those of last year. To date this year, 2,048 cases have been reported for the country as a whole as compared with 3,060 for the same period last year.

For the week ending July 28, 391 cases were reported for the country as a whole, compared with 369 for the preceding week. This increase of only 22 cases compares most favorably with an increase of 172 for the same week last year. In New York state 72 cases were reported for the week ending July 28, 25 of these being for New York City alone.

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DENTISTRY

May Replace Dentist's Drill

New device operates on sand-blast principle and cuts tooth enamel and dentin swiftly and painlessly. Is called "airbrasive".

➤ GOOD NEWS for those who dread the dentist's drill appears in the *Journal of the American Dental Association* (Aug.).

The drill may be replaced by a new device which cuts tooth enamel and dentin swiftly and without pain or noise. It was developed by Dr. Robert B. Black, of Corpus Christi, Texas.

"Airbrasive" is the name Dr. Black coined for the new instrument. It operates somewhat on the principle of a sand-blast, but does not use sand and does not use a diffuse or blast type of airstream.

Instead of sand, aluminum oxide is used as the abrasive. Other substances might be used, but Dr. Black believes this is most nearly ideal for dental work. A softer abrasive, such as pumice, might be used for removing stains in cleaning teeth. Boron dioxide, a relatively new abrasive and the hardest of all man-made materials, rivalling the diamond in abrasive properties, might also be used.

The abrasive is applied with a very fine, almost pinpoint stream of compressed air. This gives precise control over the cutting action. A secondary stream of air leads the used abrasive and tooth debris into a vacuum hood on the instrument.

No pressure is exerted against the tooth, as is done with the dentist's drill. Consequently the patient is relieved of this discomfort and the fear of the dentist's hand slipping. The dentist is also relieved of considerable tension and fatigue. The airbrasive instrument, although capable of cutting hard structures, has practically no effect on soft ones, so there is no danger to gums, cheeks, tongue or the dentist's fingers if the stream does accidentally strike any of these.

Vibration and heat, both uncomfortable accompaniments of the usual drilling to prepare a cavity for filling, are not present with the airbrasive instrument. The unpleasant hum or grinding sound is also banished. The only sound to be heard is the slight hiss of the airstream.

Besides these advantages, the airbrasive instrument is fast. One patient had to be given a hand mirror to convince her that anything had been done, the cavity preparation was accomplished so swiftly.

She was a typical nervous patient with teeth more sensitive than usual, Dr. Black had found when he previously filled eight cavities in her teeth, using the dental bur.

The first cavity he prepared with the airbrasive was on the upper left first bicuspid. (This is the fourth tooth from the center.) The cavity extended well into the dentin and when completed included about half the area of the surface of the tooth on the tongue side. It took about four minutes to complete the preparation with the airbrasive instrument. The patient was "enthusiastic" about the complete lack of any disagreeable sensation.

The airbrasive instrument will, Dr. Black believes, be ideal for eliminating deep grooves and pits on children's teeth, conditions that might become decayed spots or cavities. It has not as yet been used for this purpose, however.

Further research, investigation and development are warranted, Dr. Black believes, in order to extend to the fullest the possibilities of this new instrument.

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AERONAUTICS

Single-Seater Combats High-Flying Raiders

➤ DETAILS are now revealed on the British Westland Welkin stratosphere single-seater fighter, designed to combat high-flying raiders. It is one of the highest flying of combat planes, the largest English single-seater fighter, and has an armored pressure cabin and is equipped with four cannon.

The Welkin has a wing-span of 70 feet, is over 41 feet in length, and nearly 16 feet high. Its weight is 17,500 pounds. It is powered by two Rolls-Royce Merlin engines, each of which develops 1,650 horsepower, and by means of a two-stage two-speed supercharger maintains great power at height.

The plane is capable of 385 miles an hour, and has a range of about 1,500 miles. Extreme low temperatures are offset by a sandwich construction in which warm air is pumped between the double layers of glazing forming the pressure-resisting surface of the coupe. This heating device is light, but it keeps the cockpit so warm that special clothing is not needed even when the outside temperature is 78 degrees below zero Fahrenheit.

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***GENERAL MOTORS CENTER**—This view of the new General Motors Technical Center, which is to be built just outside the automobile center of Detroit, shows the layout of buildings and connecting roadways around the central esplanade. The central lake will supply water for cooling as well as lending beauty. At lower left is the Administration building and at lower right the new Styling building. Immediately above the latter is the Advanced Engineering building. To its left and just to the right of the water tower is the Process Development building. At the extreme end is the Research Laboratories building. Other buildings shown in the drawing represent potential expansion.*

CHEMISTRY

Colored Chemical Smokes Help in Identifying Japs

➤ DEAD MEN may still tell tales, in mopping-up operations on islands wrested from Japanese control. They do it through rainbow-colored stains on their clothing or skins, the Army's Chemical Warfare Service has disclosed.

It is a new application of the grenade-like "candles" that pour out great volumes of bright-hued smoke, originally devised for the identification of tanks or troops in the open to friendly airplanes overhead, and for other signalling purposes. The smokes come in the six principal rainbow colors, from red to violet, as well as in white and black.

When an American mopping-up patrol locates a cave system full of hold-out Japs, they heave in some smoke candles of an agreed-on color. The next cave complex will be smoked with another color. Later, when the Japs are killed or captured in the open, the tinge of the smoke still clinging to them will tell where they came from.

Although these colored smokes are non-poisonous, the Japs seem to be very much afraid of them.

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GENERAL SCIENCE

Latin-American Scientists Get U. S. Fellowships

➤ SCIENTISTS of Argentina, Brazil, Chile, Cuba, Mexico and Uruguay are represented among those awarded Latin American Fellowships of the Simon Guggenheim Memorial Foundation for advanced study in the United States.

The fellowship carries with it a stipend which is usually $2,000 for the year plus traveling expenses to the United States and return.

The following are some of those given fellowships:

Mathematics and astronomy: Prof. Rafael Laguardia, director of the Institute of Mathematics and Engineering, University of Montevideo, Uruguay. Dr. Carlos Ulrrico Cesco, University of La Plata, Argentina. Guido Munch, National Observatory of Mexico. Félix Cernuschi, University of Tucuman, Argentina.

Medicine: Dr. José Jesús Estable, Sub-Director of the Institute for Experimental Medicine, Montevideo, Uruguay. Dr. Alfonso Graña, Institute for Experimental Medicine, Montevideo, Uruguay. Dr. Eduardo Aguirre Pequeño, director, Institute of Scientific Research, University of Nuevo León, Monterrey, Mexico.

Biology: Dr. Manuel Maldonado Koerdell, chairman of the Section of Natural History, Institute of Scientific Research, University of Nuevo León, Monterrey, Mexico. Bernardo Villa Ramírez, National University of Mexico. Dr. Elisa Hirschhorn, plant pathologist, La Plata, Argentina. Sigurd Arentsen, Chilean Department of Agriculture, Santiago, Chile. Dr. Luis René Rivas y Díaz, Museum of Natural History, La Salle College, Havana, Cuba.

Other fellowships were awarded in such fields as history, geography, linguistics, agrarian policy and art.

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CHEMISTRY

Building Up Molecules Makes New Substances

➤ CHEMISTS are learning how to make new desirable substances by building up the kind of molecules desired, declared Dr. George R. Harrison, dean of science at the Massachusetts Institute of Technology. Only a few tens of thousands of different kinds of molecules have been identified as occurring in nature; now nearly a million new kinds of molecules have been produced, he stated.

"Scientists have long known," he said, "that the best way to understand a material is to understand the molecules of which it is composed." In earlier days, he added, "chemists produced new substances by mixing chemicals together, letting them fizz more or less at random, and then seeing whether the new substance obtained had properties which would be useful. Today, however, they are learning to figure out in advance how to build molecules which will have any desired property."

The spectroscope is the instrument that has enabled chemists to find out how atoms fit together to make molecules, Dr. Harrison stated, adding: "This device has unlocked even more secrets of nature than have its companions, the telescope and the microscope."

"The spectroscope is a very simple instrument," he explained, "but it gives the answers to an incredible variety of scientific questions, from the size of an atom to the weight of a star, merely by dissecting a beam of light from the star or atom and measuring its component colors or wavelengths."

Dr. Harrison spoke during a broadcast program of the New York Philharmonic Orchestra, sponsored by the United States Rubber Company.

Science News Letter, August 11, 1945

IN SCIEN

BIOCHEMISTRY

Sulfa Drugs More Effective When Used With Dyes

➤ SULFA drugs can be made effective against species of bacteria that ordinarily resist their action by using them in combination with certain synthetic dyes, Prof. F. S. Thatcher of McGill University at Quebec has discovered. The dyes found most effective in this way are known as methylene blue and brilliant cresyl blue. Both these dyes are themselves able to check the growth of bacteria, but when used in combination with one of the sulfa drugs the concentration of both dye and sulfa compound is much lower than when either is used alone.

Prof. Thatcher's results were obtained entirely with laboratory-grown bacteria in glass vessels. However, in reporting his researches in *Science* (Aug. 3), he states that clinical studies undertaken in cooperation with Dr. J. T. MacLean at the Ste. Anne de Bellevue Military Hospital "indicate a promising therapeutical value" for a combination dye-and-sulfa treatment of at least one type of infection.

Science News Letter, August 11, 1945

OPTICS

Stainless Steel Filter Gives Brighter Photographs

➤ VERY THIN films of stainless steel, which have a degree of transparency, placed in front of the wide-angle lenses used in aerial photography, furnish the solution to a former difficult problem. Heretofore in using wide-angle lenses a "hot spot" in the center of the field of vision resulted in pictures bright in the middle but dark at the edges.

Scientists of the Bausch and Lomb Optical Company developed a vignetting filter consisting of a disk of optical glass on which a film of stainless steel was deposited by a special electro-vacuum precipitation process. Placed in front of the lens, the film is thickest and transmits least light at the center of the disk, becoming gradually thinner and more transparent toward the edge. By complementing the characteristics of the photographic lens with which it is used, the filter permits photographs of ordinary density distribution.

Science News Letter, August 11, 1945

E FIELDS

PUBLIC HEALTH

TB Death Rate Declines, Effects of War Come Later

➤ IN SPITE of the war, which might have caused an increase in tuberculosis, 3,000 fewer persons died of the disease in the United States in 1944 than in 1943. The death rate based on provisional figures was 40.8 per 100,000 population, compared with 42.6 per 100,000 in 1943. Only 12 states reported increases in 1944 over their 1943 rates, while in 1943 increases over the 1942 rate were reported by 23 states.

This "definitely encouraging" news, announced by the National Tuberculosis Association, is countered by a warning from Dr. Kendall Emerson, managing director of the association.

"Because of the long course of the disease the full effect of wartime conditions on tuberculosis control in this country may not be known for several years," he said.

Two major factors, according to Dr. Emerson, undoubtedly contributed to the continued decline of tuberculosis during war years. First, the American civilian population has not had to undergo dire wartime conditions, including severe malnutrition. Second, the recent expansion of mass X-ray surveys, particularly among industrial workers, conducted by health departments and tuberculosis associations, has discovered many new cases.

Discovering new cases, he explained, was a gain against the disease because many of them were diagnosed in the early, more easily curable stage. This means not only quicker recovery for the patient but less chance of others getting the disease from him.

Science News Letter, August 11, 1945

BIOLOGY

Oysters Can Be "Forced" By Warming in Winter

➤ OYSTERS can be induced to produce eggs in winter, just as greenhouse flowers can be brought to bloom out of season, simply by warming them up to the proper temperature, Dr. Victor L. Loosanoff of the U. S. Fish and Wildlife Service laboratory in Milford, Conn., has discovered. He announces his results in *Science* (Aug. 3).

Ordinarily, oysters begin the development of their reproductive glands in early autumn, then go into an inactive stage during the winter and begin producing eggs when the water warms up in spring. Sometimes, for research purposes, it is desirable to obtain oyster eggs out of season.

Dr. Loosanoff took sexually inactive oysters from outdoor tanks where the water was so cold that a scum of ice had formed on it, and brought them indoors. They were permitted to warm up gradually to room temperatures, then further warmed until the water in which they lay was as warm as in midsummer. The oysters responded by producing eggs, as well as sperm to fertilize them, and undergoing at least the early stages of development in apparently normal manner.

Science News Letter, August 11, 1945

MEDICINE

Protein Fraction Used In Treating Poisoning

➤ SEVERE poisoning from breathing the fumes of carbon tetrachloride, widely used but somewhat risky cleaning fluid, has been successfully treated with methionine, one of the amino acids, or building-blocks out of which proteins are formed, Dr. James H. Eddy, Jr., of Shreveport, La., states. (*Journal, American Medical Association*, Aug. 4).

The patients were all Negroes, employed in an ordnance plant near Shreveport where land-mine cases are produced. Cleaning up the hot metal cases, the workers swabbed them with rags saturated in carbon tetrachloride. The fumes sent most of them out of doors to get some fresh air, but then they went back to work and finished their shift. Not until after they had gone home did they become really ill.

Several of the victims of the gas were disabled for longer or shorter periods. They described their sensations as resembling those of alcoholic intoxication, followed by faintness, dizziness, abdominal pain, nausea and vomiting. Two patients, both women, died. Autopsy showed breakdown of the liver tissues as the principal damage.

Treatment of the non-fatal cases consisted mainly in carefully adjusted diet, plus frequent doses of methionine. While Dr. Eddy feels encouraged at the results of the methionine treatment, he adds a cautionary note that more clinical data are needed, and hopes that other physicians will report their experiences.

Science News Letter, August 11, 1945

ENGINEERING

Medal Awarded for Work On Jet Propulsion

➤ MEDALS in recognition of outstanding work in application of jet-propulsion, development of turbosuperchargers, and other important engineering problems will be awarded to four prominent engineers, it is announced by the American Society of Mechanical Engineers. Honorary membership in the Society will be received by a Chinese and an English engineer and by several Americans.

The American Society of Mechanical Engineers medal, the Society's highest honor, will go to William Frederick Durand, of the National Research Council, Washington, D. C., in recognition of his work, particularly in forwarding the design and application of the principles of jet propulsion, and his services to the government in engineering research.

The Holley medal will be given to Dr. Sanford Alexander Moss of the General Electric Co., Lynn, Mass., for his pioneer work in turbosuperchargers which largely made possible the high ceilings, speed and range of modern aircraft.

Dr. Joseph M. Juran, assistant to the administrator of the Foreign Economic Administration, Washington, D. C., will receive the Worcester Reed Warner medal for his contribution to engineering literature, including his contribution to the problem of quality control in mass production.

The Melville Prize medal will go to William Julian King of the Battelle Memorial Institute, Columbus, Ohio, for a paper on "The Unwritten Laws of Engineering." His work at the institute has been chiefly with the fundamentals of combustion in liquid fuels, and the development of gas engines.

In addition to these four, Bruce E. Del Mar, supercharging engineer of the Douglas Aircraft Company, Santa Monica, Calif., will receive the Junior Award for his work and a technical paper on centrifugal compressor performance.

Honorary membership in the society will be received by Wong Wen-hao of Chungking, China, and by Sir William Arthur Stanier of London, England. Rear Admiral Harold Gardiner Bowen, U.S.N., Dugal Caleb Jackson of the Massachusetts Institute of Technology, and Audrey Abraham Potter of Purdue University will also receive honorary memberships.

Science News Letter, August 11, 1945

ENGINEERING

Amputees Can Drive

Special devices will make it easy for disabled veterans to operate any make of car. Hand service brake control permits a man without legs to stop quickly.

By MARTHA G. MORROW

➤ MANY veterans who have lost an arm or leg are asking "Will I be able to drive a car?" They and their friends may be assured that if they really want to drive, they undoubtedly will be able to do so.

Men today who have lost both legs, an arm and a leg, or both arms, are passing the most exacting driving tests, having been taught to drive safely despite their handicaps. Some who had never driven before have painfully mastered the intricacies of driving and now hold driving licenses from their home states. Sure, they can drive, either their own car or a friend's!

The more seriously injured men, and those who want ease as well as safety in driving long distances, may look forward to owning a special set of controls which can be installed in any standard car. Already demonstrated at several Army hospitals, these devices which enable an amputee to drive with one foot, one hand or mechanical hooks, will probably be on the market within a few months.

12,500 Already Drive

Many of the 12,500 men who lost either arms and legs fighting in Italy, France, Germany and the Pacific areas have already demonstrated that they can drive standard automobiles without special aids, and do so as expertly as a good driver with both arms and both legs.

Early this year an instructor training course was given at Walter Reed General Hospital, Washington, D. C., by the American Automobile Association. Looking for those slight but all-important variations between the way an average person drives and the manner in which an amputee can drive best, the AAA's general plan of driver training was adapted to meet the special needs of the wounded men. Representing the seven amputation centers, 26 Army instructors, some themselves lacking an arm or a leg, were trained to teach driving with dual control cars.

"Behind the wheel again!" brag hundreds of servicemen who are regaining confidence in their ability to drive, while others, handling a car for the first time, look forward to the time when they will earn their drivers' licenses.

A recent demonstration at one of the Army hospitals, which exhibition can probably be equalled at other amputee centers throughout the country, showed the men driving around obstacles, stopping short and parking in a manner that few old-time drivers could equal.

Gauge Space Well

A private whose left or clutch leg had been amputated above the knee drove both forward and backward on a straight line 100 feet long. Despite his limitations, he certainly "toed" the line.

Another soldier, who lost his leg below the knee, demonstrated his ability to gauge space when steering in close limits, readily avoiding the obstacles both when driving forward and when backing. A lieutenant whose right leg had been amputated stopped smoothly in 40 feet when driving 20 miles an hour. Another, who had lost his right or brake leg below the knee, stopped the car with his front wheels, and then the bumper, right over the yellow line, then repeated the performance for his back wheels and bumper.

Another test required in order to qualify for the driving certificate of the AAA was demonstrated by a soldier, both of whose legs were missing above the knee. Quickly moving his artificial legs with his hands when necessary, this private parked parallel in the only kind of parking space you are likely to find in a crowded city block. He now holds two driving licenses—and are his fellow-patients proud of him!

Next to learning to walk, driving is highest on the list of favorite courses at these hospitals.

One of the chief difficulties has been in convincing state authorities that the men can drive as safely as those with all limbs. For years some states have required that people with hands, feet, arms or legs missing have specified mechanical aids. Other states permitted the license applicant to select whatever equipment he felt he needed, merely demanding that he demonstrate that he can drive safely.

Progress is being made in this connection. Amputees at Percy Jones General Hospital, at Battle Creek, Mich., for instance, who complete the driver training course, after passing a driving test given by the Michigan State Police, are issued drivers' permits that are valid in four other states as well.

Officials of the American Association of Motor Vehicle Administrators are now working to simplify the granting of driver's licenses to disabled servicemen. This will enable those who are given drivers' examinations by state licensing officials in the various hospitals to acquire licenses for operating an automobile in their home states.

Devices which may soon be available to help disabled GI's drive more easily and safely resulted from research and actual tests carried on during recent months as a cooperative effort of the office of the Army's Surgeon General, the Society of Automotive Engineers, the Automobile Manufacturers Association

DRIVING AIDS — A few easy-to-manipulate devices are shown. Notice the steering wheel rod attached to the steering wheel, bar joining the foot pedals and extension on the accelerator. No veteran will need all of the special devices.

LITTLE TRAINING NEEDED—Specially designed devices will make it possible for the legless soldier, shown inspecting the car during a recent demonstration at Walter Reed General Hospital, to drive safely with little training.

and the American Association of Motor Vehicle Administrators.

After cataloging all the known devices —in the past many a local mechanic was called upon to create a special gadget for a cripple or infantile paralysis sufferer—the engineers set out to improve and simplify the devices, and to invent new, basic and simple aids.

As the gadgets were developed, they were installed in a car at Percy Jones General Hospital for testing. The car was successfully operated by men who each had lost from one to three limbs. As the men drove the auto and offered suggestions, further refinements and improvements were made. It was discovered, for instance, that the need for special devices is actually much less than had been anticipated.

To lower the expense of purchasing and installing the special equipment, vehicle manufacturers plan to supply packaged units which can be installed in any standard make of car by the neighborhood mechanic. The power to operate the brakes or clutch is gained from a vacuum power cylinder and control valve placed beneath the hood of the car.

These special devices will not interfere with other members of the family who want to drive the car in the usual manner. It may be, however, that others will find some of the conveniences useful on long drives and changes in the design of all automobiles eventually result from this study.

Devices Listed

No passenger car will ever need to be equipped with all the gadgets which have been developed for attachment to steering wheel post, dashboard or foot pedals —the type of disability determines which aids will be needed.

About 95% of those who have lost limbs in this war have only one arm or one leg missing. Those who have lost one leg number 9,625, three-fifths of these having lost the leg below the knee, so that their control over the artificial leg is greater. Thus far 2,875 men will return to civilian life minus an arm. Civilians also, who have lost an arm or a leg, will benefit by the training and research now being conducted to make it easier for amputees to drive.

A number of driving aids will accommodate scores of combinations of limb amputations and impairments:

Modified steering-wheel knob can be firmly gripped by a mechanical hook or artificial hand.

Hand starter control does away with the familiar foot starter button.

Steering wheel throttle and brake levers, extending either to the right or left from the steering column as desired, make it possible for a man without legs to stop the car or step on the gas.

Clutch-pedal bar permits a one-legged man to operate either clutch or brake pedal or both at the same time.

Accelerator treadle extension lets the accelerator be operated by either foot.

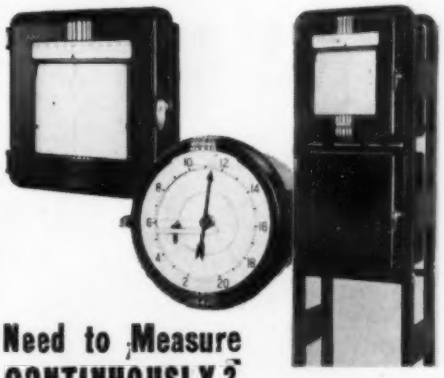
Hand service brake control permits a man without legs to stop quickly.

Automatic clutch control allows operation through accelerator treadle or interconnecting hand throttle control.

Electric direction signal eliminates hand signaling for turns.

Hill-holding device, connected with the brake and clutch, prevents the car from rolling backwards on an incline.

These devices, now receiving their final preliminary approval, will probably be available within a few months. Only a short time is needed to become accustomed to them. Prices have not yet been determined, but no profit is anticipated through their distribution. In fact,



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Do You Know?

Sweet potatoes will not stand frost, nor grow well in cool weather.

Mobile *flour mills* for liberated areas in Europe are being made in England.

Lobster eggs develop for approximately 10 months under the tail of the mother.

Flying insects have descended from wingless ancestors.

A portion of *blood plasma* leaves the capillaries to form tissue juices and is returned to the blood by lymphatic vessels.

Tomato juice is usually the most practical alternate for citrus juices at times when oranges and grapefruit are scarce or expensive.

Vegetables to be *quick-frozen* need not be sterilized but should be subjected to a blanching or scalding process to prevent loss of color, flavor, and nutritive value during the freezing storage.

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Model 100V in research laboratory of Carl Hussman Engineers, Inc., Chicago, makers of vibration control and stabilization devices.

ALL AMERICAN
Tool & Manufacturing Co.
1014 Fullerton Ave., Chicago (14)

one auto manufacturing company has already announced that special equipment will be provided free of cost to disabled soldiers who drive that particular make of car.

Science News Letter, August 11, 1945

PSYCHIATRY

Unaware of Others

➤ AN unusual mental illness affecting children of intelligent parents in which the small patients live in a strange world of their own completely without people has been observed by Dr. Leo Kanner, child psychiatrist of Baltimore. Nearly half the families of these children are represented in *Who's Who* or in *American Men of Science*, or both.

Loving hands dressing or caring for these children are to them just hands—objects not belonging to any person. And when an adult takes away a toy or steps on something the child wants, the child becomes angry at the offending hand or foot but never so much as looks up at its owner.

Seven of the 20 children so far observed with this illness have never learned to talk, but even those who did learn to talk did not, over a period of years, use language to convey any meaning to other people. They usually do not pay any attention when they are spoken to and show no interest whatever in conversation going on around them.

Although, at one time or another, all of these children have been thought to be feeble-minded because of their strange behavior, actually all have good intelligence. Some were even considered as infant prodigies. One little boy, Charles, in a family with considerable musical talent was able at the age of only a year and a half to discriminate between 18 symphonies. He recognized the composer as soon as the first movement started and would say his name. Paul at three years knew the words of 37 songs as well as many nursery rhymes.

But the tragedy of the illness is summed up in the words of Charles' mother, "The thing that upsets me most is that I can't reach my baby." Apparently from the beginning of life these babies have lived alone "in a shell" and shut out, ignored, disregarded anything that came to them from outside. Nearly every mother reported that never had her baby held up his arms to be picked up.

Left alone, however, the children seem happy and they handle inanimate objects with skill and pleasure.

They have an anxiously obsessive desire for sameness. Changes of routine, of surroundings, even of furniture arrangement may be violently upsetting to them.

Dr. Kanner raises the question as to whether the gifts of the parents might not have actually contributed to the illness of their children. For the most part, parents, grandparents, uncles and aunts are persons strongly preoccupied with abstractions of a scientific, literary, or artistic nature and are limited in genuine interest in people. Even some of the happiest marriages are rather cold and formal affairs.

And yet the children's aloneness from birth makes it difficult to attribute the illness entirely to relations with the parents.

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Different varieties of *tomatoes* have different amounts of vitamin C.

JUST HANDS—Mother's hands dressing or caring for her baby are only hands and nothing more to the infant suffering from an unusual mental illness of children of intelligent parents. The child never looks up at the person belonging to the hands. This photograph was posed by the Science Service staff photographer, Fremont Davis, to show how a child with this illness might react to a mother's care.

POST WAR CAR FOR MILLIONS OF AMERICANS

Let's imagine it's the day after V-J Day.

Millions of American families who've patriotically suppressed their desire to go places during wartime are now anxious to be out on the road again.

But many of these families won't have a car of their own for some time to come, for thousands of cars will have gone out of service, and it may take years to replace them.

Won't it be only natural then for many travel-hungry Americans to turn to the buses that have served them so well during the war years? Furthermore, other millions of men, women and children will continue to rely on buses for daily transportation—to work, to school, for shopping and visiting.

Thus the bus operator's postwar job may become bigger and more difficult than ever. However, there's one factor that will tend to make things somewhat easier. That is the better gasoline that will be available. (Today the best gasoline—improved with Ethyl fluid—is still fighting.)

We of Ethyl look forward to helping the bus industry make the best use of this better gasoline certain to come. We hope, through the continuation of cooperative research and service activities, to contribute to the improvement of engines, fuels and motor transportation itself.

ETHYL CORPORATION, *Chrysler Building, New York 17, N. Y.*

Manufacturers of Ethyl fluid, used by oil companies to improve the antiknock quality of aviation and motor gasolines.

BOTANY

NATURE RAMBLINGS
by Frank Thone

Routing the Ragweeds

➤ VICTORY in hayfever-ridden mankind's hitherto hopeless war against ragweeds seems to be in sight, as a result of experiments with herbicidal sprays conducted by Dr. B. H. Grigsby, of Michigan State College, who is also botanist to the Michigan Department of Health (*Science,* July 27).

Two chemicals seem to offer most promise in the campaign. One is dinitro-secondary-butyl-phenol, known for greater convenience as G-412. The other is penta-chlor-phenol, whose convenience-designation is G-410. Both are applied in kerosene solutions, with pressure-spray machines.

G-412 gave the most complete kill, Dr. Grigsby reports. The vegetative portions of the plants, as well as the flower spikes, turned brown, and pollen release was stopped. G-410 gave a 75% kill in 12 hours, and permanently stopped pollen production, but some of the stems remained alive and continued growth until frost.

Despite the lower killing results reported for G-410, this compound may prove the more desirable for practical use. Dr. Grigsby points out that there is some objection to the immediate and drastic wiping out of ragweed in some spots because, pest though it is, ragweed is given to growing on loose, newly exposed soil and serves as a temporary check on erosion. The two commonest ragweed species are both annuals, so there is no harm in letting them live, if only their power to produce clouds of sneeze-provoking pollen is taken away.

The pollen-stopping chemical sprays cannot be used without caution or limit. The kerosene solvent itself is harmful to many cultivated plants. The chemicals are not toxic to human beings or domestic animals, but they do damage crop plants and so cannot be sprayed indiscriminately over fields and gardens. However, some of the worst ragweed concentrations occur along highways and railroad tracks, in over-grazed pastures, and on neglected vacant lots, rubbish dumps and other wasteland areas in and near cities. Here the weed-killing spray-artillery can be given an unlimited field of fire.

Science News Letter, August 11, 1945

CHEMISTRY

Soybean Oil Production Equals That of Cottonseed

➤ THE SOYBEAN is now Americanized, and soybean oil, its principal commercial product, is now manufactured in the United States in a quantity equal to that produced from cottonseed, which long was America's greatest source of edible oils. The soybean oil industry in America is only about two decades old, although imported soybean oil has been used for much longer than that. Wartime conditions greatly boosted production, but peacetime uses will probably keep up the present rate.

Soybean oil is used in the United States for shortening, margarine, other edible products, soap, paints and varnishes, linoleum and oilcloth, and in printing inks, but its principal use is in foods. Approximately 96% of the 1943 production was used in edible products, according to O. H. Alderks of the Soybean Research Council, reporting in *Chemical and Engineering News* (July), published by the American Chemical Society.

Some 891,000,000 pounds of soybean oil was used in 1943 in food products, he says. It has now replaced a great amount of cottonseed oil in shortening, the cottonseed oil having been shifted to other edible products. In margarine it has replaced all coconut, babassu and similar oils, and accounts for about 40% of margarine fats. In salad oils and cooking fats, 124,000,000 pounds were used in 1943, replacing the unobtainable coconut and palm oils of the Pacific area.

Soybean oil has a number of desirable qualities, Mr. Alderks states. It has generally low bleaching costs, whiter products, good rancidity behavior, and good consistency behavior. Its undesirable characteristics are poor flavor stability, particularly of the lower-grade oils, and additional cost to hydrogenate.

Flavor stability will improve, according to Mr. Alderks, with an improvement in the entire soybean industry beginning with improved farm practices, better and quicker harvesting, prompt drying when necessary, better storage, and improved methods of oil extraction.

Science News Letter, August 11, 1945

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APPROACHES TO NATIONAL UNITY, Fifth Symposium—Lyman Bryson and others, eds.—*Harper,* 1037 p., $5. Prepared for the fifth meeting of the Conference on Science, Philosophy and Religion in their Relation to the Democratic Way of Life.

CHECK-LIST OF THE BIRDS OF NEBRASKA—F. W. Haecker, R. Allyn Moser and Jane B. Swenk—*Neb. Ornithologists' Union,* 40 p., 50 cents. Reprinted from the Nebraska Bird Review, vol. 13, May, 1945.

CHICAGO NATURAL HISTORY MUSEUM: Report of the Director to the Board of Trustees for the year 1944—*Chicago Natural Hist. Museum,* 133 p., illus., paper, $1. A continuation of the report series of Field Museum of Natural History.

HIDDEN HUNGER—Icie G. Macy and Harold H. Williams—*Cattell,* 286 p., $3. The tragedy of the unbalanced diet. Humanizing Science Series.

PLANT GROWTH—L. Edwin Yocum—*Cattell,* 203 p., illus., $3. The relationship between the laws of nature and the growth of plants, written for the layman.

QUALITATIVE ANALYSIS: A Brief Outline—Harry N. Holmes—*Macmillan,* 52 p., $1.10. Ninth ed., revised.

RACE RIOTS AREN'T NECESSARY—Alfred McClung Lee—*Public Affairs Comm.,* 31 p., paper, illus., 10 cents. Prepared in cooperation with the Amer. Council on Race Relations. Public Affairs Pamphlet No. 107.

THE STORY OF THE SPRINGFIELD PLAN—Clarence I. Chatto and Alice L. Halligan—*Barnes & Noble,* 201 p., illus., $2.75. Education of one community for citizenship.

TIHUANACU, The Cradle of American Man, Vols. I and II—Ing. Arthur Posnansky—*Augustin,* 246 p., illus., $25. Parallel English and Spanish texts. English trans. by James F. Shearer.

Science News Letter, August 11, 1945

OPTICS

Anti-Aircraft Guns Given Deadlier Aim

➤ "LIGHT SPLITTER" it is called, a rectangular glass plate the size of a calling card with an exceedingly thin chemical coating on one side; used, in pairs, to give deadly aim to American anti-aircraft guns. As used in a new range-finder, the pair of light splitters, or light dividers, serve to transmit to the eye-piece two separate images, one of one color, the other of a complementary color. By superimposing one on the other, the range is automatically determined.

To range the target, the gunner, by manipulating controls on the finder, brings the two images together until a single sharp natural-colored image appears. The finder is mounted on an automatic director which computes range and height factors, and aims the battery of guns by applying the firing data to them electrically.

The light splitter, known technically as a color-selective reflector, was developed by the Radio Corporation of America. It is used in the new U. S. Army M-10 range finder, development of which has already been announced. It is a direct outgrowth of an earlier development made by RCA for the solution of a Hollywood sound-film recording problem, made before the war.

The nature and series range of the selection of chemicals which create the divider are a closely guarded secret, but upon putting to use a phenomenon which the functioning of the device depends causes a normal percentage of light to be reflected at the air-glass boundary of a glass element. It is known, also, that the dividing action is generated by the minutely-thin multiple-layer coating in conjunction with the air on its one boundary and the glass at the other, the glass itself performing no other important function except to furnish a mechanical support.

Science News Letter, August 11, 1945

"I can make a better Microscope"

Professor Gilman was startled by the statement of his guest, Charles A. Spencer. He had been exhibiting his prize possession—a microscope made by Chevalier of Paris. That was in the fall of 1846. Often during the following months, Dr. Gilman, a professor in the College of Physicians and Surgeons, New York, amused his friends with the story of the presumptuous backwoodsman who challenged the leading optician of France.

Six months later Spencer presented two objectives to the Professor.

Gilman placed them on his microscope and studied specimen after specimen. At last, bursting with excitement, he gave his verdict: "Why these are excellent! How did you do it?"

Charles Spencer took home to Canastota, New York, the first order ever given to an American for the manufacture of a microscope.

In another six months (October, 1847) the microscope was completed. On his way to deliver it, Spencer stopped at West Point to have the instrument tested by Professor J. W. Bailey, "father of microscopic research in America." Bailey was enthusiastic, acclaimed it "decidedly superior to Chevalier's" and added that it was at least equal to the Lowell instrument at Boston.

Thus Charles A. Spencer, self-taught and with only the experience gained in his homemade workshop, took his place beside the most experienced opticians of Europe.

Today, nearly a century later, the name Spencer is the hallmark of highest quality in scientific instruments. Research insures the perpetuation of the Spencer ideal.

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Manufacturers of **SPENCER** *Scientific Instruments*

•New Machines and Gadgets•

❁ *MINIATURE kitchens, dress suitcase size, will be used by salesmen visiting homes for possible installations. Cabinets, closets, stove and refrigerator are made to scale of stiff cardboard, and the various items can be shifted to fit any ordinary home kitchen and show the housewife how her workshop can best be arranged.*

Science News Letter, August 11, 1945

❁ *SHOES with slightly hollowed heels will give proper support to the arch of the foot, it is claimed, without the need of special inserted arch supports. The rest of the shoe is shaped like the ordinary footwear, but under the heel of the foot a concave recess is formed into which the wearer's heel fits.*

Science News Letter, August 11, 1945

❁ *ARC-OXYGEN electrode, a war development for under-water cutting of metals in sunken ships, combines the tremendous heat of the electric arc with the corrosive cutting effect of pure oxygen. It looks like an ordinary pea-shooter, and can cut a quarter-inch steel plate 40 feet under water at a rate of a foot per second.*

Science News Letter, August 11, 1945

❁ *PHOSPHORESCENT plastice tape, cream-colored in daylight and blue-green in darkness, is made in three layers —the phosphorescent pigment is between a special white synthetic adhesive on its back and a clear protective film on its face. It will stick and hold to almost any material under various weather conditions.*

Science News Letter, August 11, 1945

❁ *BRAZING by radiation is accomplished in the so-called hydrogen bottle shown in the picture. It is used in brazing copper parts by radiation from an incandescent filament which has a temperature of about 2,000 degrees Centigrade. The copper parts are heated to around 900 degrees.*

Science News Letter, August 11, 1945

❁ *STRETCHING MACHINE, to shape aluminum extrusions to form a variety of bomber parts, consists of a table-height base upon which are mounted two hydraulic jaws, and a contour form to match the shape desired. The jaws pull the aluminum against the form with pressures up to 1,300 pounds, forcing it into shape.*

Science News Letter, August 11, 1945

❁ *HYDRAULIC transmission system, used on Navy PT Boats, sends "ahead" "neutral" or "back" signals to engine room from the bridge. The signals are transmitted instantaneously, without use of electricity or other outside source of power, by this hydraulic device which automatically compensates for expansion due to temperature changes.*

Science News Letter, August 11, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 271.

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